

A MODEL OF COMETARY ACTIVITY AND SOME PROBLEMS OF CELESTIAL

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To analyze some problems of applied celestial mechanics connected with the comets, on the base of some theoretical, observational, and experimental studies performed in the field of comet activity, the paper develops an approximate model of the cometary gas and dust activity for a short-periodic comet, heliocentric distance 1-5 AU, comet nucleus radius $R \sim 0.5-10$ km, cometocentric altitude of about $0-100R$ [1,2]. The mass gas and dust production rates are determined, as well as the gas and dust velocities. To analyze an integral dust flux property, the distribution function of a grain mass is used. Some geometrical characteristics of the jets are considered. The model uses various origins of the activity: the gas sublimation of water-dominated ice and dust blowing from the small high-active spots on the nucleus surface, gas and dust ejection through the porous mantle on the large low-active surface region, gas and dust jets from the inner pockets through the cracks in the mantle. Comparison with some more exact models, observations, and experimental data gave a satisfactory fit.

The effect of the comet outgassing and dust emission on the spacecraft motion near the comet nucleus [3], as well as on the correction of the comet orbit to mitigate the comet hazard [4], are considered.

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